Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the instant application:

Listing of Claims:

1. (Currently Amended) A method of broadcasting multi-layered information in a multi-antenna broadcasting system comprising:

identifying at least a first and second layer of information to be transmitted;

encoding the first layer of information for transmission, wherein encoding the first layer of information comprises differentially encoding a product of the first layer of information and a first unitary code matrix, $\boldsymbol{U}_b$ representing the first unitary code matrix and being selected from the set

$$\mathcal{X}_b = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \right\}$$

such that the product of the first layer of information and the first unitary code matrix is defined by $\boldsymbol{U}_b \in \mathcal{X}_b$;

encoding the second layer of information for transmission, wherein the second layer of information is encoded using a second unitary code matrix different from the first unitary code matrix; and

transmitting the first and second layers of the multi-layered information with the multi-antenna broadcasting system.

2. (Cancelled)

3. (Cancelled)

4. (Cancelled)

5. (Currently Amended) The method of claim [[4]] 1, said step of encoding the second layer of information comprising differentially encoding a product of the second layer of information and the second unitary code matrix.

6. (Currently Amended) The method of claim 5, wherein $\boldsymbol{U}_a$ represents the second unitary code matrix and is selected from the set

$$\mathcal{X}_a = \left\{ \begin{bmatrix} e^{i\pi\lambda} & 0 \\ 0 & e^{i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{i\pi\gamma} & 0 \\ 0 & e^{i\pi\lambda} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\lambda} & 0 \\ 0 & e^{-i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\gamma} & 0 \\ 0 & e^{-i\pi\lambda} \end{bmatrix} \right\}$$

such that the product of the second layer of information and the second unitary code matrix is defined by $\boldsymbol{U}_a \in \mathcal{X}_a$ χ_a.

7. (Original) The method of claim 6, wherein the transmitted signal $\boldsymbol{X}$ at a time t is defined by $\boldsymbol{X}(t) = \boldsymbol{X}(t\text{-}1)\boldsymbol{U}_b(t)\boldsymbol{U}_a(t)$.

8. (Currently Amended) A multi-antenna system for broadcasting multi-layered information comprising:

means for identifying at least a first and second layer of information to be transmitted;

means for encoding the first layer of information for transmission, said means for encoding the first layer of information comprising means for differentially encoding a

product of the first layer of information and a first unitary code matrix, U_b representing the first unitary code matrix and being selected from the set

$$\mathcal{X}_b = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \right\}$$

such that the product of the first layer of information and the first unitary code matrix is defined by $U_b \in \chi_b$;

means for encoding the second layer of information for transmission, wherein the means for encoding the second layer of information encodes the second layer of information using a second unitary code matrix different from the first unitary code matrix; and

means for transmitting the first and second layers of the multi-layered information with the multi-antenna broadcasting system.

9. (Cancelled)

10. (Cancelled)

11. (Cancelled)

12. (Currently Amended) The system of claim [[11]] 8, said means for encoding the second layer of information comprising means for differentially encoding a product of the second layer of information and the second unitary code matrix.

13. (Currently Amended) The system of claim 12, wherein $\boldsymbol{U}_a$ represents the second unitary code matrix and is selected from the set

$$\mathcal{X}_a = \left\{ \begin{bmatrix} e^{i\pi\lambda} & 0 \\ 0 & e^{i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{i\pi\gamma} & 0 \\ 0 & e^{i\pi\lambda} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\lambda} & 0 \\ 0 & e^{-i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\gamma} & 0 \\ 0 & e^{-i\pi\lambda} \end{bmatrix} \right\}$$

such that the product of the second layer of information and the second unitary code matrix is defined by $\boldsymbol{U}_a \in \mathcal{X}_a$ χ_a.

14. (Original) The system of claim 13, wherein the transmitted signal $\boldsymbol{X}$ at a time t is defined by $\boldsymbol{X}(t) = \boldsymbol{X}(t\text{-}1)\boldsymbol{U}_b(t)\boldsymbol{U}_a(t)$.

15. (Currently Amended) A machine readable storage, having stored thereon a computer program having a plurality of code sections executable by a machine for causing the machine to perform the steps of:

identifying at least a first and second layer of information to be transmitted;

encoding the first layer of information for transmission using a first unitary code matrix; said step of encoding the first layer of information comprising differentially encoding a product of the first layer of information and a first unitary code matrix, $\boldsymbol{U}_b$ representing the first unitary code matrix and being selected from the set

$$\mathcal{X}_b = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \right\}$$

such that the product of the first layer of information and the first unitary code matrix is defined by $\boldsymbol{U}_b \in \chi_b$;

encoding the second layer of information for transmission using a second unitary code matrix; wherein the second layer of information is encoded using a second unitary code matrix different from the first unitary code matrix; and

transmitting the first and second layers of the multi-layered information with the multi-antenna broadcasting system.

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Currently Amended) The machine readable storage of claim [[18]] 15, said step of encoding the second layer of information comprising differentially encoding a product of the second layer of information and the second unitary code matrix.

20. (Currently Amended) The machine readable storage of claim 19, wherein $\boldsymbol{U}_a$ represents the second unitary code matrix and is selected from the set

$$\mathcal{X}_a = \left\{ \begin{bmatrix} e^{i\pi\lambda} & 0 \\ 0 & e^{i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{i\pi\gamma} & 0 \\ 0 & e^{i\pi\lambda} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\lambda} & 0 \\ 0 & e^{-i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\gamma} & 0 \\ 0 & e^{-i\pi\lambda} \end{bmatrix} \right\}$$

such that the product of the second layer of information and the second unitary code matrix is defined by $\boldsymbol{U}_a \in \mathcal{X}_a$ χ_a.

21. (Original) The machine readable storage of claim 20, wherein the transmitted signal $\boldsymbol{X}$ at a time t is defined by $\boldsymbol{X}(t) = \boldsymbol{X}(t\text{-}1)\boldsymbol{U}_b(t)U_a(t)$.

22. (Currently Amended) A method of processing multi-layered information received from a multi-antenna broadcasting system comprising:

receiving a wireless transmission comprised of multi-layered information, wherein each layer of the information is encoded;

decoding at least a first layer of information from the wireless transmission, wherein decoding the first layer of information comprises differentially decoding a product of the first layer of information and a first unitary code matrix, $\boldsymbol{U}_b$ representing the first unitary code matrix and being selected from the set

$$\chi_b = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \right\}$$

such that the product of the first layer of information and the first unitary code matrix is defined by $\boldsymbol{U}_b \in \chi_b$;

decoding a second layer of information from the wireless transmission; wherein the second layer of information is decoded using a second unitary code matrix different from the first unitary code matrix; and

presenting the decoded information.

23. (Cancelled)

24. (Cancelled)

25. (Cancelled)

26. (Cancelled)

27. (Currently Amended) The method of claim [[26]] 22, said step of decoding the second layer of information comprising differentially decoding a product of the second layer of information and the second unitary code matrix.

28. (Currently Amended) The method of claim 27, wherein $\boldsymbol{U}_a$ represents the unitary code matrix and is selected from the set

$$\mathcal{X}_a = \left\{ \begin{bmatrix} e^{i\pi\lambda} & 0 \\ 0 & e^{i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{i\pi\gamma} & 0 \\ 0 & e^{i\pi\lambda} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\lambda} & 0 \\ 0 & e^{-i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\gamma} & 0 \\ 0 & e^{-i\pi\lambda} \end{bmatrix} \right\}$$

such that the product of the second layer of information and the second unitary code matrix is defined by $\boldsymbol{U}_a \in$ ~~X_a~~ χ_a.

29. (Original) The method of claim 28, wherein the wireless transmission $\boldsymbol{X}$ at a time t is defined by $\boldsymbol{X}(t) = \boldsymbol{X}(t\text{-}1)\boldsymbol{U}_b(t)\boldsymbol{U}_a(t)$.

30. (Currently Amended) A system for processing multi-layered information received from a multi-antenna broadcasting system comprising:

means for receiving a wireless transmission comprised of multi-layered information, wherein each layer of the information is encoded;

means for decoding at least a first layer of information from the wireless transmission, said means for decoding the first layer of information comprising means for

differentially decoding a product of the first layer of information and a first unitary code matrix, $\boldsymbol{U}_b$ representing the first unitary code matrix and being selected from the set

$$\mathcal{X}_b = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \right\}$$

such that the product of the first layer of information and the first unitary code matrix is defined by $\boldsymbol{U}_b \in \mathcal{X}_b$;

means for decoding a second layer of information from the wireless transmission, wherein the second layer of information is decoded using a second unitary code matrix different from the first unitary code matrix; and

means for presenting the decoded information.

31. (Cancelled)

32. (Cancelled)

33. (Cancelled)

34. (Cancelled)

35. (Currently Amended) The system of claim [[34]] 30, said means for decoding the second layer of information comprising means for differentially decoding a product of the second layer of information and the second unitary code matrix.

36. (Currently Amended) The system of claim 35, wherein $\boldsymbol{U}_a$ represents the second unitary code matrix and is selected from the set

$$\mathcal{X}_a = \left\{ \begin{bmatrix} e^{i\pi\lambda} & 0 \\ 0 & e^{i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{i\pi\gamma} & 0 \\ 0 & e^{i\pi\lambda} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\lambda} & 0 \\ 0 & e^{-i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\gamma} & 0 \\ 0 & e^{-i\pi\lambda} \end{bmatrix} \right\}$$

such that the product of the second layer of information and the second unitary code matrix is defined by $\boldsymbol{U}_a \in$ ~~X_a~~ χ_a.

37. (Original) The system of claim 36, wherein the wireless transmission $\boldsymbol{X}$ at a time t is defined by $\boldsymbol{X}(t) = \boldsymbol{X}(t\text{-}1)\boldsymbol{U}_b(t)\boldsymbol{U}_a(t)$.

38. (Currently Amended) A machine readable storage, having stored thereon a computer program having a plurality of code sections executable by a machine for causing the machine to perform the steps of:

receiving a wireless transmission comprised of multi-layered information, wherein each layer of the information is encoded;

decoding at least a first layer of information from the wireless transmission, wherein the first layer of information is decoded using a first unitary code matrix decoding the first layer of information comprising differentially decoding a product of the first layer of information and a first unitary code matrix, $\boldsymbol{U}_b$ representing the unitary code matrix and being selected from the set

$$\mathcal{X}_b = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \right\}$$

such that the product of the first layer of information and the first unitary code matrix is defined by $\boldsymbol{U}_b \in \chi_b$;

decoding a second layer of information from the wireless transmission, wherein the second layer of information is decoded using a second unitary code matrix different from the first unitary code matrix; and

presenting the decoded information.

39. (Cancelled)

40. (Cancelled)

41. (Cancelled)

42. (Cancelled)

43. (Currently Amended) The machine readable storage of claim [[42]] 38, said step of decoding the second layer of information comprising differentially decoding a product of the second layer of information and the second unitary code matrix.

44. (Currently Amended) The machine readable storage of claim 43, wherein $\boldsymbol{U}_a$ represents the second unitary code matrix and is selected from the set

$$\chi_a = \left\{ \begin{bmatrix} e^{i\pi\lambda} & 0 \\ 0 & e^{i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{i\pi\gamma} & 0 \\ 0 & e^{i\pi\lambda} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\lambda} & 0 \\ 0 & e^{-i\pi\gamma} \end{bmatrix}, \begin{bmatrix} e^{-i\pi\gamma} & 0 \\ 0 & e^{-i\pi\lambda} \end{bmatrix} \right\}$$

such that the product of the second layer of information and the second unitary code matrix is defined by $\boldsymbol{U}_a \in \cancel{X_a}\ \underline{\chi_a}$.

45. (Original) The machine readable storage of claim 44, wherein the wireless transmission $\boldsymbol{X}$ at a time t is defined by $\boldsymbol{X}(t) = \boldsymbol{X}(t\text{-}1)\boldsymbol{U}_b(t)U_a(t)$.